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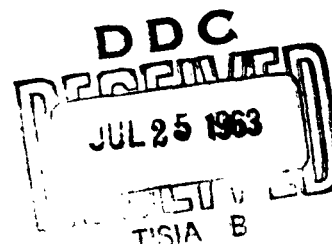
Technical Note N-506

PLASTIC PIPE IN-SERVICE TEST (12ND)  
(Second Report)

17 May 1963

by:  
R. J. Zablodil

U. S. NAVAL CIVIL ENGINEERING LABORATORY  
PORT HUENEME, CALIFORNIA



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ABSTRACT

The object of this task is to determine the most suitable pipe materials or types of coated pipe which can be substituted at an economical advantage for presently specified systems, including pipe that is subjected to corrosive environments.

This report pertains to a thermosetting plastic pipe used as a steam condensate carrier. The pipe has carried 2,487,500 pounds of condensate from 17 August 1961 to 31 December 1962 without fixed dimensional changes, visual evidence of degradation, or color change. Tests are continuing.

## INTRODUCTION

By Bureau authority,<sup>1</sup> approximately 130 feet of 2-inch plastic pipe was installed in building 260, NAS Treasure Island, 12ND, during the week of 7 August 1961, for the purpose of determining the suitability of plastic pipe as a steam condensate carrier. About 90 feet of the pipe, including an expansion loop, is hanging from a 16-foot ceiling. The pipe then drops vertically to a lower test section which is 5 feet 4 inches above the floor. This section which is approximately 40 feet long, includes at the end of the section a pressure recorder, a condensate sampler and a condensate meter. The installation of the pipe was performed by contract and was witnessed and reported by the Laboratory.<sup>2</sup> The contractor did not encounter any unusual problems, although he mentioned that his work was slower than usual because he was unfamiliar with plastic pipe. The pipe is of the laminated, thermo-setting epoxy-glass type with a coefficient of linear thermal expansion essentially equal to that of steel pipe. Since the condensate carried by the pipe is emptied into a vented receiver, the pressure in the test section is very low and rarely reads above 0 psig on the pressure recorder. The DPWO 12ND collects the test data and forwards it to the Laboratory for analysis and reporting.

## TEST DATA

This report covers approximately 16-1/2 months of operation from 17 August 1961 to 31 December 1962. During this period the plastic pipe carried a total of 2,487,500 pounds of condensate at an average temperature of 165 F and at a pressure of 0 psig as measured by the pressure recorder. Readings were taken at various times during the first 12 days of the test, but thereafter were usually taken once a week between 0800 and 0900. Figure 1 shows the amount of flow and the temperature of the condensate observed during this reporting period.

The pipe is being closely watched for any physical changes. Measurements are made four or five times a year to determine whether permanent sag or expansion has occurred and also whether the outside diameter of the pipe has changed. Measurements of sag are made vertically at four points which are located midway between the hangers of the lower test section. Sag is also measured between each of three pre-determined points on the expansion loop. Two horizontal measurements are taken of the expansion loop and another horizontal measurement is made at the beginning of the lower test section to determine the occurrence of permanent expansion. Outside diameter measurements of the pipe are made along the lower test section where the vertical measurements are made. Outside diameter measurements are also made at

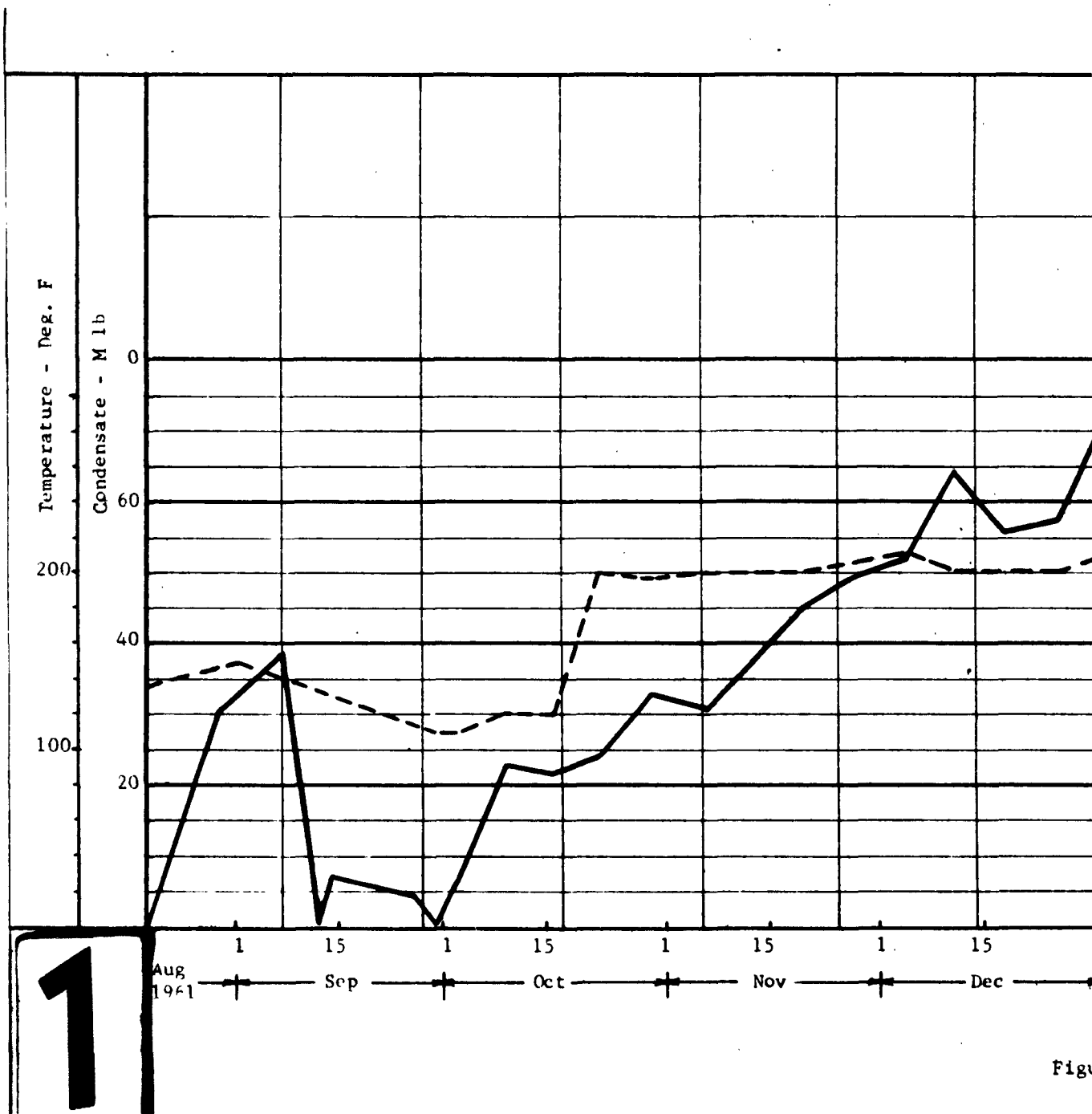
four locations on the expansion loop. These measurements show no significant sag or expansion. The largest variation was 1/8 inch in the vertical direction and .004 inch in diameter. These variations are well within the limits of normal movement and dimensional changes expected of the pipe.

These tests of the plastic pipe will continue so that conclusive data can be obtained.

Samples of condensate are taken and analyzed for various properties. Table I shows the analyses of samples taken up to 27 September 1962.

#### REFERENCES

1. BUDOCKS ltr D-233/RLC:mvs to NCEL of 28 Dec 1959.
2. NCEL ltr w/encl 163/RJS:ls Y-R007-08-004 ser 1300 to BUDOCKS of 15 Aug 1961.





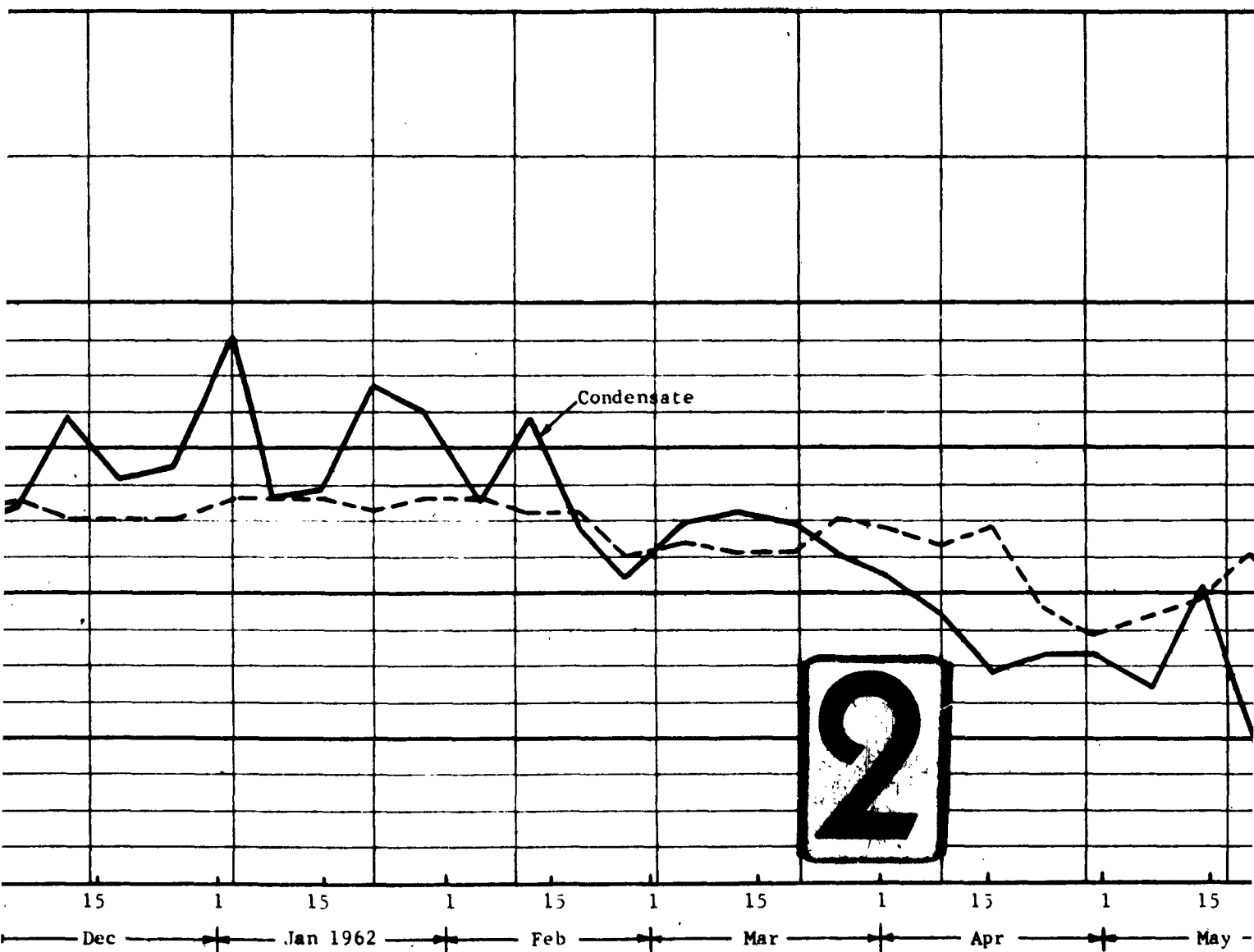
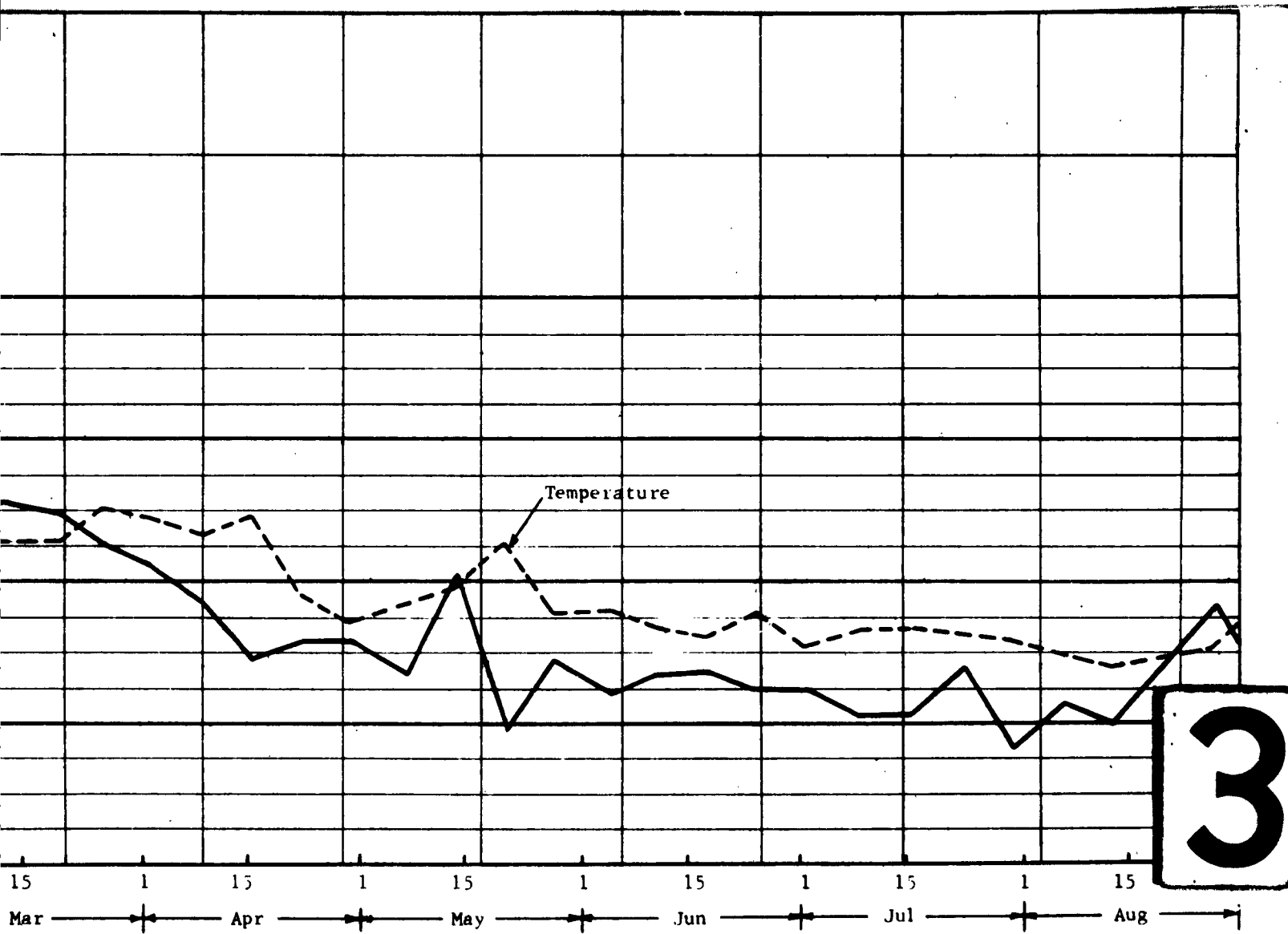


Figure 1. Plastic Pipe In-Service Test - NAS Treasure Island-12ND



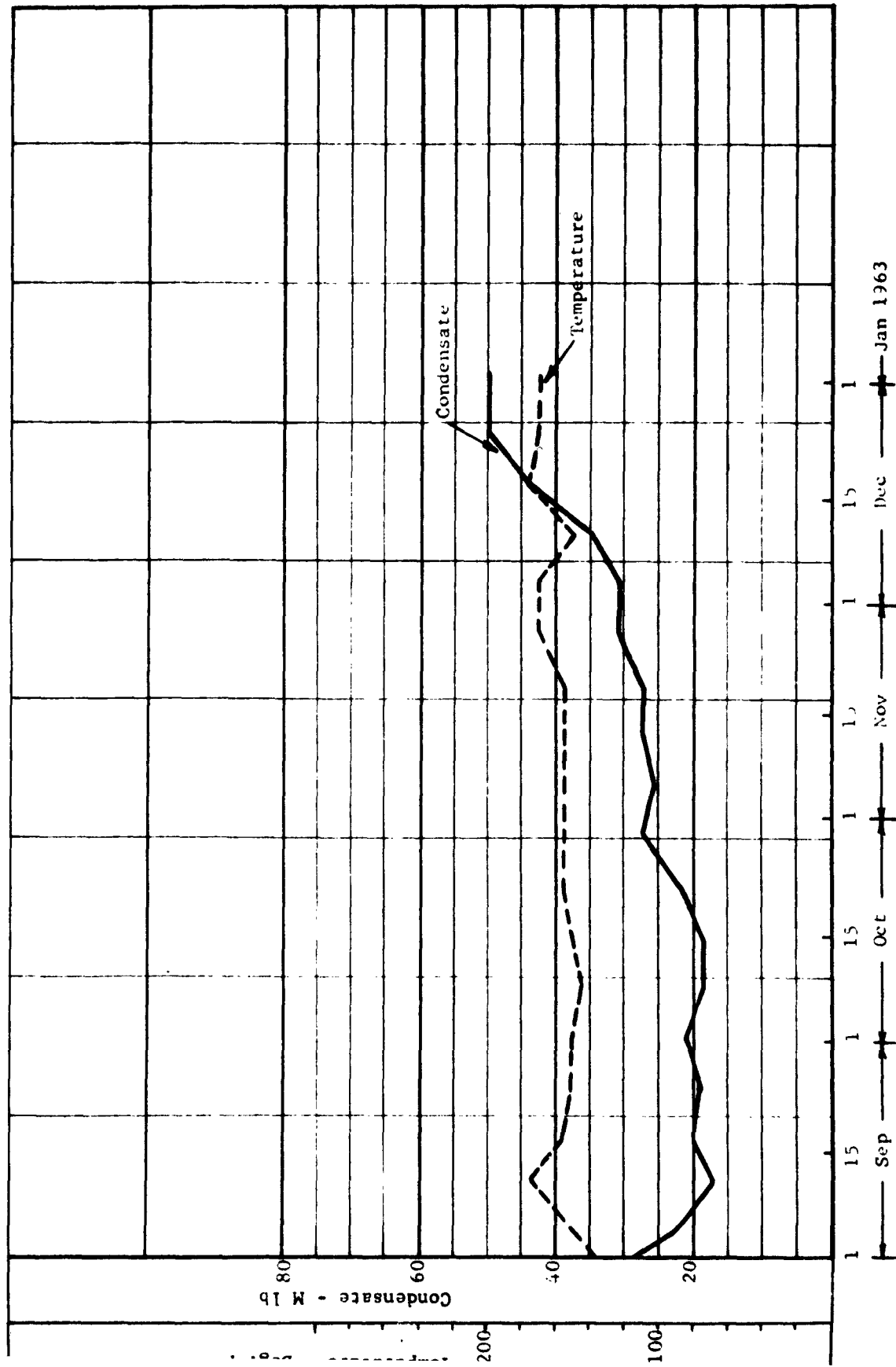


Figure 1. Plastic Pipe In-Service Test - NAS Treasure Island-12ND (cont'd).

Table I. Analysis of Condensate

Item		Sample Number			
		1	2	3	4
Field Analysis	Date	11-22-61	11-29-61	9-13-62	9-27-62
	Temp-F	180	180	180	160
	CO <sub>2</sub> -ppm	5	10	5	12
	O <sub>2</sub> -ppm	1.9	3.8	5	6
	Turbidity	1.8	0.5		
Routine Laboratory Analysis	Alkalinity-P (CaCO <sub>3</sub> )	0	0	0	0
	Alkalinity-MO (CaCO <sub>3</sub> )	2.4	2.4	1.4	2.0
	Total Hardness CaCO <sub>2</sub>	0	0		
	Total Dissolved Solids	2.6	2.8	1.0	3.0
	Specific Conductance umhos	3.4	3.7	3.7	5.0
	Chloride -ppm	0.2	0.2	0.2	0.0
	Iron -ppm	0.5	0.6	0.23	0.24
	pH	5.95	7.35	6.1	5.8